

Why isn't the U.S. on the metric system?

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This standard wooden ruler in which inches mingle freely with centimeters says a lot about the state of the U.S. measuring system.

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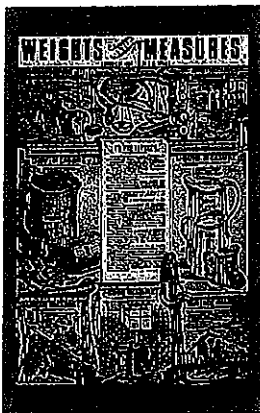
Why isn't the U.S. on the metric system?

Many myths swirl around the metric system and U.S. involvement with it. Let's dispel a few. First, the relationship between the metric system and the United States dates back to the 18th century, not the 1970s. Second, all countries have either fully adopted or legally sanctioned the **International System of Units**, or **SI**, the modern form of the metric system. That includes the U.S., Liberia and Myanmar, three countries often listed as the sad-sack metric losers. Finally, a country doesn't simply "turn on" on a brand-new system of weights and measures. Even France, the brainchild behind decimal-based measuring, adopted its own metric system in fits and starts. And all countries use legacy units alongside metric ones, at least in colloquial expressions.

Despite America's long history with SI units, measuring remains a mess in the States. A football field traffics in yards while most footraces prefer meters. Mechanics measure the power of an automobile engine in horsepower (foot-pounds per second), but express the same engine's displacement in liters. Air pressure is denoted in all sorts of ways: pounds per square inch (or psi) for tire pressure, inches of mercury for surface atmospheric pressure and millibars for air pressure aloft.

And these are just a few examples. In the **U.S. Customary System**, or the inch-pound system, more than 300 different units exist to measure various physical quantities. Many of those units use the same name but have very different meanings. On the U.S. Metric Association Web site, contributor Dennis Brownridge identifies at least nine different meanings for the unit we know as a "ton": short ton, displacement ton, refrigeration ton, nuclear ton, freight ton, register ton, metric ton, assay ton and ton of coal equivalent.

To understand why the U.S. doesn't use the metric system in its commercial activities and everyday life, it helps to look at a brief history of how the European system of measurement came to U.S. soil.



This U.S. poster from 1897 gets the word out about the country's measuring system.

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History

As subjects of the British Empire, American colonists inherited and used the **British Imperial System**, which itself evolved from a tangled mess of medieval weights and measures. Even as France developed and refined the metric system throughout the late 1700s, England and its American colonies pressed forward with an antiquated measurement system.

It's not that American leaders didn't want to control the chaos. In the Constitution of the newly formed United States of America, Article I, Section 8 provided that Congress should have the power "to coin Money ... and fix the Standard of Weights and Measures." The first practical analysis of this provision fell to George Washington's Secretary of State, Thomas Jefferson, in 1790. Jefferson endorsed a decimal system of measurement but, when presented with the basic principles of the decimal-based metric system, felt reluctant to steer his nation in that direction. He feared that the U.S. wouldn't be able to verify the metric unit of length without sending a costly delegation to France.

The evolving political situation didn't help matters. Although France supported the American colonies during the Revolutionary War, it became hostile to the U.S. after Jay's Treaty was ratified in 1795. The French viewed the treaty, which eliminated British control of posts in the Northwest Territories and provided America a limited right to trade in the West Indies, as a blossoming alliance between the U.S. and England. France retaliated by sending privateers to target American merchant ships. By the time John Adams became president in 1797, the hostilities between the U.S. and France had grown quite intense. It's no surprise, then, that in 1798, France snubbed the U.S. when it invited dignitaries from foreign countries to travel to Paris to learn about the metric system.

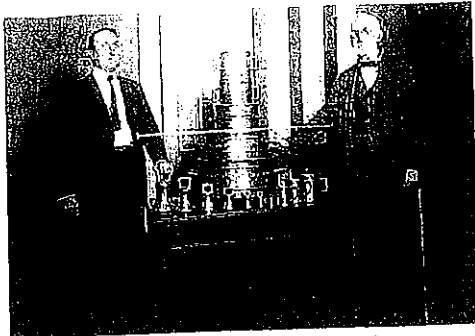
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Even if U.S. representatives had visited Paris in 1798 and been wowed by the metric demonstration, it's unlikely that they would have persuaded American leaders to change the country's system of weights and measures. In 1821, after studying the various units of measurement used by the 22 states, Secretary of State John Quincy Adams determined that the U.S. Customary System was sufficiently uniform and required no changes. In addition, there was concern among American statesmen that the French commitment to the metric system might falter in the aftermath of Napoleon Bonaparte's ill-fated reign during the early 19th century.

Up next: The metric system moves forward.

The U.S. Decision to Recognize the Metric System



Two bureaucrats circa 1900 pose before attending to the very official, very serious business of keeping up weights and measures in the U.S. Standards Office in Washington, D.C. Buyenlarge/Getty Images

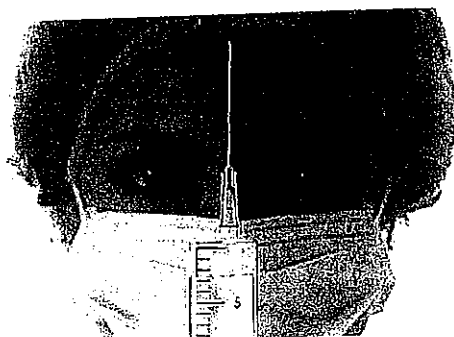
Over time, however, the metric system gained traction. By the time the American Civil War ended in 1865, most of Europe had adopted the decimal-based measuring system, and the U.S. could no longer ignore it. In 1866, an act of Congress, signed into law by President Andrew Johnson, made it "lawful throughout the United States of America to employ the weights and measures of the metric system in all contracts, dealings or court proceedings."

This time when France brought together the world's leading nations nine years later to discuss a new international version of the metric system, the U.S. received an invitation and sent delegates. These nations signed the Treaty of the Meter, establishing the International Bureau of Weights and Measures, an International Committee for Weights and Measures to run the bureau and the General Conference on Weights and Measures to consider and adopt changes. The treaty also specified a lab to be maintained in Sèvres, near Paris, to house the international metric standards, such as the International Prototype Metre, and allowed for these standards to be distributed to each ratifying nation.

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Kilogram in 1890. The Mendenhall Order of 1893 (named after T.C. Mendenhall, who served as the Superintendent of Weights and Measures at the time) stipulated that the fundamental standards for length and mass in the U.S. be based on metric units. The yard was defined as 3600/3937 meter, and the pound-mass was defined as 0.4535924277 kilogram. In 1959, English-speaking countries agreed on new and improved conversion factors: 1 yard equals 0.9144 meter and 1 pound-mass equals 0.45359237 kilogram exactly.

That means, as of this writing, the U.S. has officially -- and legally -- recognized the metric system for 145 years and has based the units of its standard weights and measures on metric units for almost 120 years. As we'll see on the next page, however, recognition doesn't necessarily translate into practical use.



Is it us, or does she look excited that the syringe in her hands is based on the metric system?
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The Metric System in the U.S. Today

Mendenhall joined a growing number of scientists and political leaders who advocated making use of the metric system in the U.S. compulsory. When he died in 1924, however, America hadn't made the move. That seemed about to change in 1971, when a U.S. National Bureau of Standards report titled "A Metric America" recommended that the U.S. transition to the metric system over the course of 10 years. In response, Congress enacted the Metric Conversion Act in 1975 but stripped out the 10-year deadline and made the conversion voluntary. Although schoolchildren across America began studying SI units in earnest and a few companies embraced metrication, the rallying cry to go metric faded, as did any real movement to make the switch.

In the meantime, as globalization increased, American companies found themselves competing against international interests. More and more, foreign customers buying U.S. products required that they be delivered, labeled and produced in metric units. And when American companies went to build new factories in Europe or Asia, they faced the challenge of standardizing to U.S. measurements or the metric system -- decisions with enormous financial consequences.

Recognizing these issues, Congress passed amendments to the Metric Conversion Act in 1988, designating the metric system as the "preferred system of weights and measures for United States trade and commerce" and requiring federal agencies to use "the metric system of measurement in its procurements, grants, and other business-related activities" by the end of 1992. The amendments, however, continued to make metrication voluntary for private industry, and although they encouraged the federal government to assist small businesses interested in making the conversion, progress has been slow.

By some estimates, about 30 percent of products manufactured by American companies have gone metric [source: Smith]. The pharmaceutical industry went "hard metric," which means its products display only metric units. Beverages, on the other hand, typically show both U.S. Customary units and metric units together, making them "soft metric." Film, tools and bicycles are also sold in metric measurements. For the most part, though, the U.S. remains the only industrialized nation that hasn't made the metric system compulsory.

Why not? We'll tackle a few of the reasons next.

Moving to Meters Means Money

Cost is one reason the U.S. has been slow to adopt the metric system. Converting technical drawings and operations manuals for complex equipment with many parts can take thousands of man-hours. NASA engineers, for example, recently reported that converting the space shuttle's relevant drawings, software and documentation to SI units would require \$370 million -- about half the cost of a typical space shuttle launch [source: Marks].

Of course, cost alone can't explain America's reluctance to go metric. Certain psychological attributes also play a significant role. American stubbornness makes its

citizens resistant to change, especially when that change is being driven by foreign governments. Perhaps citizens still harbor distrust and ill will for being snubbed by the French when the metric system had its coming-out party in 1798. Or, more likely, they simply like doing things a bit differently. Individualism has always been a defining characteristic of the American experience. The quality allowed pioneers to hack a nation from an immense wilderness. You could easily envision bumper stickers with a variation on the old National Rifle Association (NRA) slogan: "You can have my inch-pounds when you pry them from my cold, dead hands."

The most logical explanation, however, just may be the failure of Congress to make the metric system mandatory in all 50 states, the District of Columbia and its territories. By making conversion voluntary in all major legislation since 1866, the U.S. has failed to restrict the use of traditional units in transactions that touch the daily lives of ordinary citizens. Until that mandate comes -- and it will likely come soon if the U.S. is to remain competitive with growing economic powers, such as China and India -- many Americans will continue to think in terms of inches and pounds instead of meters and kilograms.